

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. - 8. (Canceled).

9. (Currently Amended) A polycrystalline silicon film on a buffer layer that is on a substrate, the polycrystalline film containing nickel metal of which density ranges 2×10^{17} to 5×10^{19} atoms/cm³, and an electrical conductivity activation energy between 0.53 eV and 0.71 eV, the polycrystalline silicon film comprising a plurality of needle-shaped silicon crystallites;

metal electrodes on opposite sides of the polycrystalline silicon film; and
an electric field substantially across the polycrystalline silicon between the metal electrodes,

wherein the polycrystalline silicon film is formed by crystallizing an amorphous silicon film containing nickel metal by a thermal treatment carried in a temperature of 400 to 500 °C and due to the applying an electric field with metal electrodes, and

wherein the needle-shaped silicon crystallites are formed by movement of a silicide of the metal.

10. (Previously Presented) The polycrystalline silicon film according to claim 9, wherein the polycrystalline film includes one of gold(Au) and cobalt(Co) instead of nickel metal.

11. (Previously Presented) The polycrystalline silicon film according to claim 9, wherein the nickel metal works as a catalyst during the crystallization.

12. - 19. (Canceled)

20. (New) A polycrystalline silicon film on a buffer layer that is on a substrate, the polycrystalline film containing nickel metal of which density ranges 2×10^{17} to 5×10^{19} atoms/cm³, and an electrical conductivity activation energy between 0.53 eV and 0.71 eV, the polycrystalline silicon film comprising a plurality of needle-shaped silicon crystallites;

metal electrodes on opposite sides of the polycrystalline silicon film;

an electric field substantially across the polycrystalline silicon between the metal electrodes; and

a heating element that heats the polycrystalline silicon film,

wherein the polycrystalline silicon film is formed by crystallizing an amorphous silicon film containing nickel metal by heating the polycrystalline film to a temperature of 400 to 500 °C and due to the electric field, and

wherein the needle-shaped silicon crystallites are formed by movement of a silicide of the metal.